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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/554,593

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ALEXANDRIA, VA 22320

EXAMINER

MILLER, DANIEL H

ART UNIT

PAPER NUMBER

1775

MAIL DATE

DELIVERY MODE

06/01/2007

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/554,593	Applicant(s) HIRAKATA ET AL.	
	Examiner Daniel Miller	Art Unit 1775	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 15 November 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-56 is/are pending in the application.
- 4a) Of the above claim(s) 20-56 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-19 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date <u>1/25/2006</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Election/Restrictions

1. Restriction is required under 35 U.S.C. 121 and 372.

This application contains the following inventions or groups of inventions which are not so linked as to form a single general inventive concept under PCT Rule 13.1.

In accordance with 37 CFR 1.499, applicant is required, in reply to this action, to elect a single invention to which the claims must be restricted.

Group I, claim(s) 1-19, drawn to a nanotube electrical device.

Group II, claim(s) 20-56, drawn to a method of making a nanotube electrical device.

2. The inventions listed as Groups I and II do not relate to a single general inventive concept under PCT Rule 13.1 because, under PCT Rule 13.2, they lack the same or corresponding special technical features for the following reasons: The nanotubes of claim 1 are not required to be in solution as in method claim 20. Further, the method of claim 20 requires a base body not claimed in independent claim 1.

3. During a telephone conversation with Kevin Jones on 5/15/07 a provisional election was made with traverse to prosecute the invention of group I, claims 1-19.

Affirmation of this election must be made by applicant in replying to this Office action.

Claims 20-56 are withdrawn from further consideration by the examiner, 37

CFR 1.142(b), as being drawn to a non-elected invention.

Claim Rejections - 35 USC § 112

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

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The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claims 1-19 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Regarding claim 1, what is a carrier? It is not clear how the term carrier imparts structural limits on the claim. Therefore, any article otherwise meeting the limitations of the claimed invention will be deemed to be capable of performing this function and also meets this limitation.

3. Regarding claim 13, how can functional groups comprise functional groups? Regarding claims 17-19, what is a transporter layer? How would one conform to a formation area of the transporter layer as required by claim 17? It is not clear how the transporter layer and the electrode are distinct from one another as inferred by claim 18. Correction required.

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

1. Claims 1-19 are rejected under 35 U.S.C. 103(b) as being unpatentable over Segal et al (U.S. 6,574,130) in view of Lavin (U.S. 6,426,134B1).

Segal et al (U.S. 6,574,130), which discloses a substrate (110), having at least three carbon nanotube ribbon switches that can contact an electrode (abstract, and figures). The moving switch of Segal can be made with nanotube ribbon or wire or nanotubes which can be functionalized. The nanotube switch comprises a transporter layer of nanotube ribbons and the electrode, which enables the switch to function.

However, Segal is silent as to the exact structure of the cross-linking site forming the ribbon.

2. Regarding claim 1, Lavin teaches nanotubes with unique electrical and mechanical properties (column 1 line 50-60). Lavin further teaches nanotubes (treated with acid) with one or more carboxylic acid groups (or amine linkages) (column 5 line 47-55; column 3 line 60-65). The nanotubes can be copolymerized (cross-linked) with precursor polymers and then formed into a chip (a coating that acts as an electrical contact) and bonded to a plug (base body) (column 6 line 6-10).

3. It would have been obvious to a person of ordinary skill in the art to form a nanostructure for use in Segal using the structure of Lavin because the crosslinking of the nanotubes inherently forming a unified and stronger structure, that is superior to alternative weaker molecular forces (i.e. Van der Waal forces) that can bond nanotubes together.

4. The electrodes of Segal are considered to act as a "carrier" with voltage applied and a "transporter layer" to the extent to which applicant has defined those terms.

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5. Regarding claims 2-4, the electrical configurations claimed by applicant are well known in the art and would be obvious uses and/or configurations for any material known to be useful as an electrode.
6. Regarding claim 9, The nanotubes are obtained by curing a solution (see example 1 column 6 line 38-68, column 7 line 1-45 Lavin).
7. Regarding claims 10-14, the cross linking agent is polyamide or polyimide which is not self-polymerizable (column 2 line 62-68 Lavin).
8. Regarding claim 7, the polymers used would inherently form one of the structures of claim 7 because they are the same polymer cross-linking agents as applicants.
9. Regarding claim 15-16, the nanotubes would inherently be bonded and the reaction that linked the nanotubes would inherently be one of the types of reaction enumerated by applicant.
10. Regarding claims 7 and 8 and 12, the nanotubes can have amine or carboxyl functional groups depending on the treatment, as stated above. Therefore, multiple functional groups are inherently bonding together to form cross-linking and the linking site would inherently be COO, or NH, or NHCOO.
11. Regarding claims 17-19, the carbon nanotubes of Segal are patterned to form "transporting layers", the substrate is considered to be inherently "flexible" to some degree (see silicon substrate (110) column 5 line 25-30), and the nanotubes are integrated on the substrate (see figures Segal).

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12. Regarding claim 5 and 6, it would be obvious to use either single walled or multi walled nanotubes since both are inherently capable of forming functional groups and polymerizing.

13. Regarding claims 10-14, it should be noted that, "even though product-by-process claims are limited by and defined by the process, determination of patentability is based on the product itself. The patentability of a product does not depend on its method of production. If the product in the product-by-process claim (or limitation) is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process.", (In re Thorpe, 227 USPQ 964,966). Once the Examiner provides a rationale tending to show that the claimed product appears to be the same or similar to that of the prior art, although produced by a different process, the burden shifts to applicant to come forward with evidence establishing an unobvious difference between the claimed product and the prior art product (In re Marosi, 710 F.2d 798, 802, 218 USPQ 289, 292 (Fed. Cir. 1983), MPEP 2113). Therefore, differentiations in the process are not pertinent to patentability. Therefore, the examiner need only show the claimed cross-linking agents were or are taught not that the article was subject to "curing" a solution of carbon nanotubes, as claimed by applicant.

Conclusion

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Any inquiry concerning this communication or earlier communications from the examiner should be directed to Daniel Miller whose telephone number is (571)272-1534. The examiner can normally be reached on M-FTh.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jennifer McNeil can be reached on (571)272-1540. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Daniel Miller



JENNIFER MCNEIL
SUPERVISORY PATENT EXAMINER
5/29/7